

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: Toshimitsu KOHARA, et al.

SERIAL NO: New U.S. PCT Application Based on PCT/JP03/10114

GAU:

FILED: Herewith

EXAMINER:

FOR: PROCESS FOR PRODUCING ALUMINA COATING COMPOSED MAINLY OF ALPHA-TYPE CRYSTAL STRUCTURE, ALUMINA COATING COMPOSED MAINLY OF ALPHA-TYPE CRYSTAL STRUCTURE, LAMINATE COATING INCLUDING THE ALUMINA COATING, MEMBER CLAD WITH THE ALUMINA COATING OR

## INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR 1.97

COMMISSIONER FOR PATENTS  
ALEXANDRIA, VIRGINIA 22313

SIR:

Applicant(s) wish to disclose the following information.

## REFERENCES

- ☒ The applicant(s) wish to make of record the references listed on the attached form PTO-1449. Copies of the listed references are attached, where required, as are either statements of relevancy or any readily available English translations of pertinent portions of any non-English language references.
- ☐ A check or credit card payment form is attached in the amount required under 37 CFR §1.17(p).

## RELATED CASES

- ☐ Attached is a list of applicant's pending application(s), published application(s) or issued patent(s) which may be related to the present application. In accordance with the waiver of 37 CFR 1.98 dated September 21, 2004, copies of the cited pending applications are not provided. Cited published and/or issued patents, if any, are listed on the attached PTO form 1449.
- ☐ A check or credit card payment form is attached in the amount required under 37 CFR §1.17(p).

## CERTIFICATION

- ☐ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement.
- ☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application or, to the knowledge of the undersigned, having made reasonable inquiry, was known to any individual designated in 37 CFR §1.56(c) more than three months prior to the filing of this statement.

## DEPOSIT ACCOUNT

- ☒ Please charge any additional fees for the papers being filed herewith and for which no check or credit card payment is enclosed herewith, or credit any overpayment to deposit account number 15-0030. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

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Form PTO 1449 (Modified)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTY DOCKET NO. 265206US0PCT		SERIAL NO. New U.S. PCT Application Based on PCT/JP03/10114	
LIST OF REFERENCES CITED BY APPLICANT				APPLICANT Toshimitsu KOHARA, et al.			
				FILING DATE Herewith		GROUP	
U.S. PATENT DOCUMENTS							
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FILING DATE IF APPROPRIATE
	AA	5851687	12/22/98	Sandvik AB. (Equivalent to JP 7-216549)			
	AB						
	AC						
	AD						
	AE						
	AF						
	AG						
	AH						
	AI						
	AJ						
	AK						
	AL						
	AM						
	AN						
FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	TRANSLATION YES NO		
	AO	2000-218409	08/08/00	JP			NO
	AP	2742049	1/30/98	JP			NO
	AQ	5-208326	8/20/93	JP			NO
	AR	2002-53946	02/19/02	JP			NO
	AS	59-8679	01/17/84	JP			NO
	AT	2000-44370	02/15/00	JP			NO
	AU	2002-543993	12/24/02	JP			NO
	AV	2002-543997	12/24/02	JP			NO
OTHER REFERENCES (Including Author, Title, Date, Pertinent Pages, etc.)							
	AW						
	AX						
	AY						
	AZ					<input type="checkbox"/> Additional References sheet(s) attached	
Examiner					Date Considered		
*Examiner: Initial if reference is considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.							

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Docket No.: 265206US0PCT

### STATEMENT OF RELEVANCY

- 1) References AA & AO have been cited in the International Search Report. Copies of these references are being submitted herewith only when not automatically provided by the International Searching Authority.
- 2) References \_\_\_\_\_ have been cited in the corresponding \_\_\_\_\_ Search Report. A copy of these references is being submitted herewith.
- 3) References AP-AV are discussed in the specification. A copy of these references is being submitted here with.
- 4) Reference \_\_\_\_\_ is additional prior art known to Applicant. A copy of these references is being submitted herewith.

1. Japanese Pat. JP-2742049 (1998)

PROBLEM TO BE SOLVED: To apply alumina coating to a base body of a cutting tool, which is sufficiently tough and which can be formed easily.

SOLUTION: A coated cutting tool is provided with a cutting face 12, a flank 14, a cutting edge 16, which is on the jointing part between the cutting face 12 and the flank 14, a base body 18, and a coating, which is joined to the base body 18. The coating consists of an IVB-metal-aluminum alloy layer 20, which is deposited to the base body 18 through a physical vapour deposition and an alumina layer 22, which is deposited to the IVB-metal-aluminum alloy layer 20 through the physical vapour deposition.

2. Japanese Pat. JP-A-HEI-5-208326 (1993)

PURPOSE: To render hard coating extremely hard and manufacturable at extremely low temperature by forming them from generally (Al, Cr) $2O_3$ -mixed crystals with a chrome content higher than 5 at.%.

CONSTITUTION: A workpiece 1 is coated in (Al, Cr) $2O_3$  by a chemical (CVD) or physical (PVD) coating process at a temperature lower than 900°C. This coating preferably has a higher chrome content at tool surfaces mainly exposed to chemical wear when used than at such tool surfaces as friction surfaces less subjected to chemical wear but more placed under stress by friction when used. Without any quenching after the coating process, the workpiece 1 is provided with a hard coating of (Al, Cr) $2O_3$ -mixed crystals with a chrome content higher than 5 at.%.

3. Japanese Pat. JP-A-2002-53946 (2002)

PROBLEM TO BE SOLVED: To provide a useful hard film with which an aluminum oxide of corundum structure having excellent heat resistance, wear resistance, etc., can be formed under a low-temperature condition which does not cause deterioration in the characteristics of a base material.

SOLUTION: An oxide film of corundum structure having 4.779 to 5.000 Å lattice constant and at least 0.005  $\mu m$  film thickness is formed. Then, the aluminum oxide film of corundum structure is formed on one side of the above oxide film. Further, an oxide film composed of any of  $Cr_2O_3$ , (Fe, Cr) $2O_3$  and (Al, Cr) $2O_3$  is recommended as the above-mentioned oxide film.

4. Japanese Pat. JP-A-SHO-59-8679 (1984)

5. Japanese Pat. JP-A-2000-44370 (2000)

PROBLEM TO BE SOLVED: To provide a cBN-based sintered product cutting tool

coated with Al<sub>2</sub>O<sub>3</sub>, exhibiting excellent abrasion resistance, especially crater abrasion resistance, on the cutting of an iron-based high hard and slightly sliceable material and on the cutting of an iron-based material at a high rate and in high efficiency.

SOLUTION: This cBN-based sintered product cutting tool coated with Al<sub>2</sub>O<sub>3</sub> is obtained by disposing one or more Al<sub>2</sub>O<sub>3</sub> layers on at least a portion of the cutting-relating surface of a cBN-based sintered product matrix. The sintered product matrix contains cBN in an amount of 20-99 vol.% and Al<sub>2</sub>O<sub>3</sub> having an average particle diameter of less than or equal to 1  $\mu$  m in an amount of greater than or equal to 1.0 vol.% and <10 vol.%. The Al<sub>2</sub>O<sub>3</sub> layer has a thickness of 0.5-50  $\mu$  m. The Al<sub>2</sub>O<sub>3</sub> layer has an average crystal particle diameter (s) of 0.01-4  $\mu$  m, when the thickness d is 0.5-25  $\mu$  m, and the Al<sub>2</sub>O<sub>3</sub> layer further has an average crystal particle diameter (s) of 0.01-10  $\mu$  m, when the thickness d is 25-50  $\mu$  m. Since the cBN-based sintered product cutting tool coated with Al<sub>2</sub>O<sub>3</sub> uses the cBN-based sintered product exhibiting excellent plastic deformation resistance at high temperature as the matrix and is coated with the Al<sub>2</sub>O<sub>3</sub> having excellent chemical stability in good tight adhesivity, the cBN-based sintered product cutting tool coated with Al<sub>2</sub>O<sub>3</sub> has excellent abrasion resistance, especially crater resistance, at high temperature and under high loads.

6. Japanese Pat. JP-A-2000-543993 (2000)

The present invention describes a coated CBN cutting tool for metal machining. The tool consists of one or more CBN bodies with or without cemented carbide backing. The coating is composed of one or more layers of refractory compounds of which at least one layer consists of fine-grained, crystalline gamma -phase alumina, Al<sub>2</sub>O<sub>3</sub>, with a grain size less than 0.1  $\mu$  m. The Al<sub>2</sub>O<sub>3</sub>-layer is deposited with a bipolar pulsed DMS technique (Dual Magnetron Sputtering) at substrate temperatures in the range 450 °C to 700 °C.

7. Japanese Pat. JP-A-2000-543997 (2000)

The present invention describes a coated CBN cutting tool for metal machining. The tool consists of one or more CBN bodies with or without cemented carbide backing. The coating is composed of one or more layers of refractory compounds of which at least one layer consists of fine-grained, crystalline gamma -phase alumina, Al<sub>2</sub>O<sub>3</sub>, with a grain size less than 0.1  $\mu$  m. The gamma -phase alumina is deposited with a Plasma Activated Chemical Vapor Deposition (PACVD) process in which the plasma is produced by applying a bipolar pulsed DC voltage across two electrodes to which the tool substrates to be coated are fixtured and electrically connected.